

(12) UK Patent Application (19) GB (11) 2 115 954 A

(21) Application No 8235547
(22) Date of filing 14 Dec 1982

(30) Priority data

(31) 354827

(32) 4 Mar 1982

(33) United States of America
(US)

(43) Application published
14 Sep 1983

(51) INT CL³
G04B 37/00 39/00

(52) Domestic classification
G3T A2B A2C A2D

(56) Documents cited
GB 0207999
GB 0750786
GB 0682953

US 4015418

(58) Field of search
G3T

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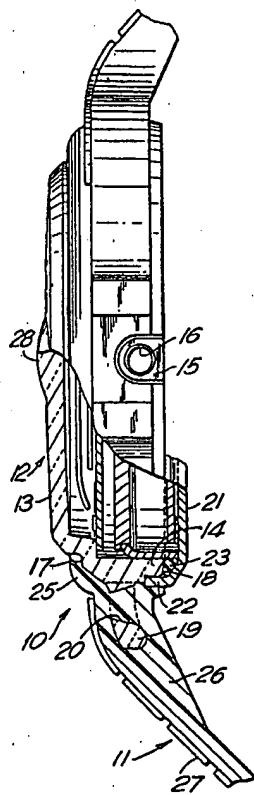
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(54) Watchcase assembly with integral
plastics strap and bezel

(57) A watch strap and bezel are
moulded from plastics material to pro-
vide a bezel section 10 and integrated
flexible strap sections 11. The bezel 10
is adapted to retain a bell-shaped crys-
tal 12 of transparent plastics with a
central view portion 13. The crystal 12
has a depending wall portion 14
arranged to receive a caseback 21 of
metal or plastics with a water-resistant
seal 23. The crystal wall portion 14
includes an integral pendant 15 for a
stem or push button, and has ears or
lugs 19 which are moulded into the
bezel 10, or which snap into bezel
recesses.

FIG. I



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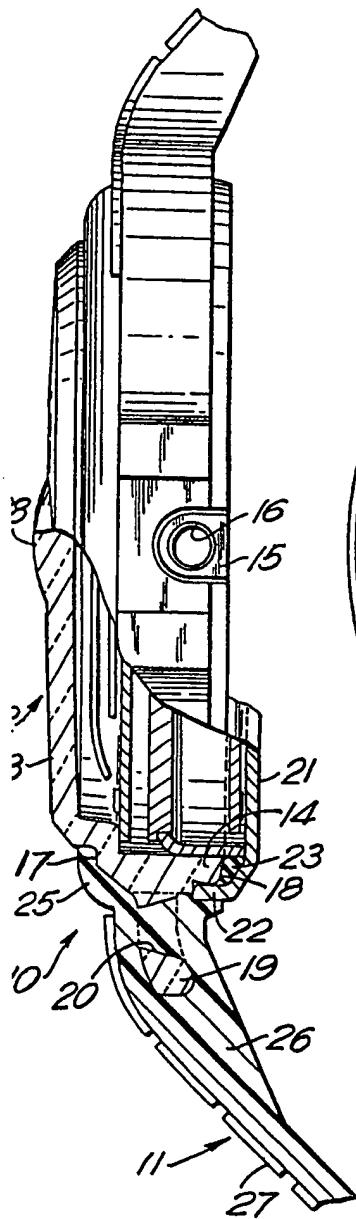


FIG.1

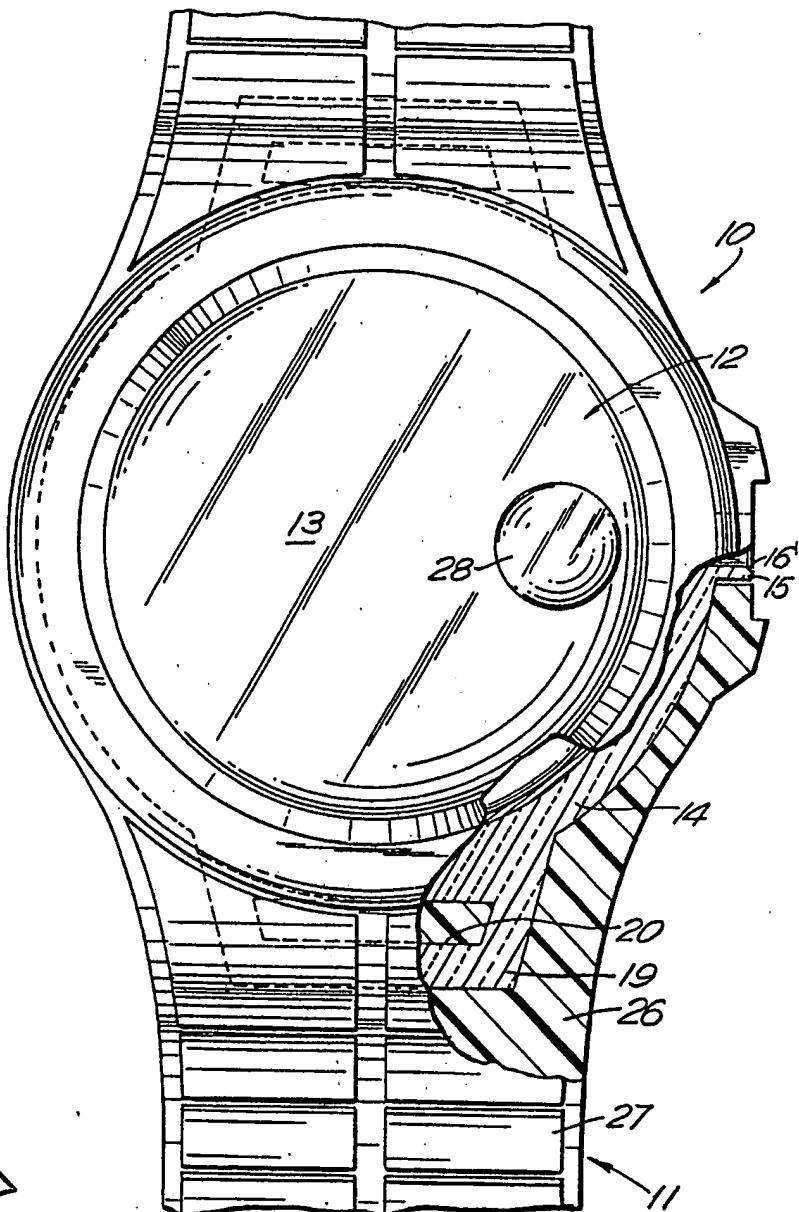
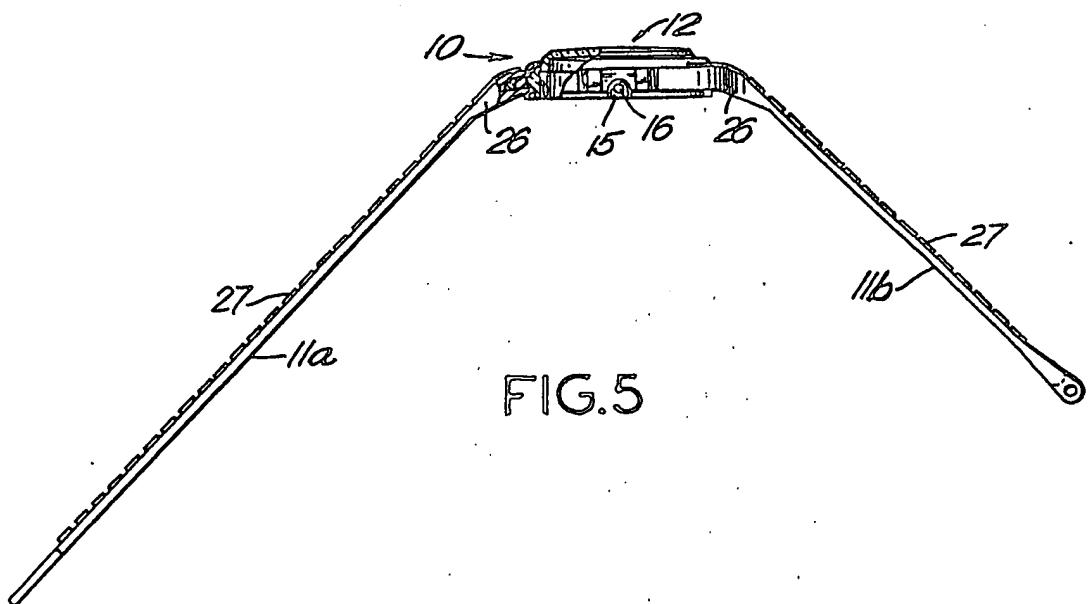
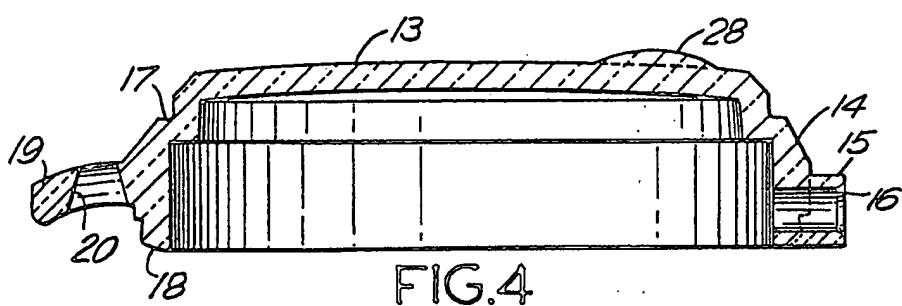
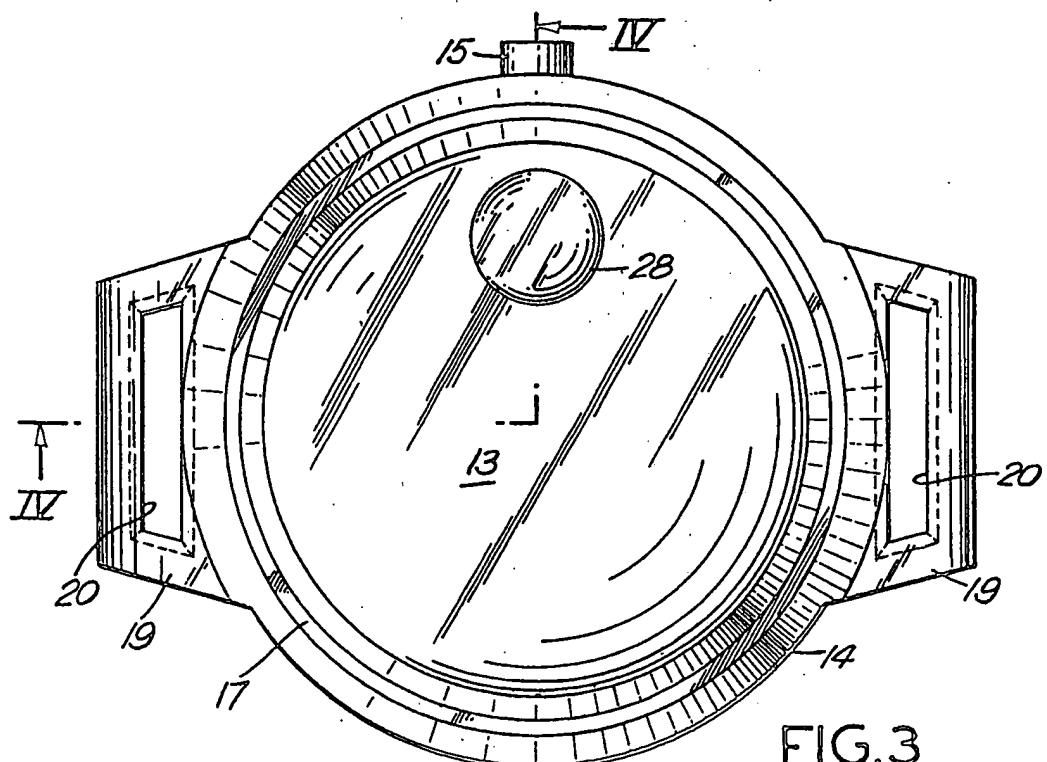


FIG.2



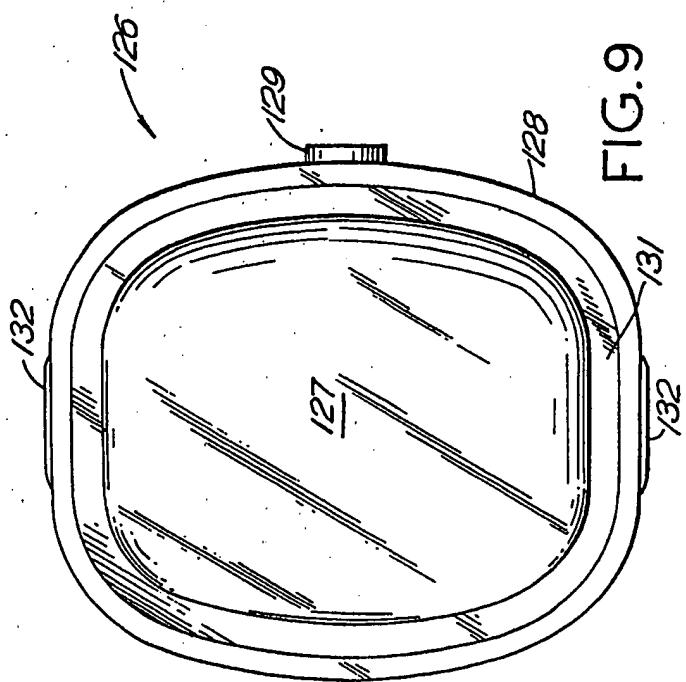
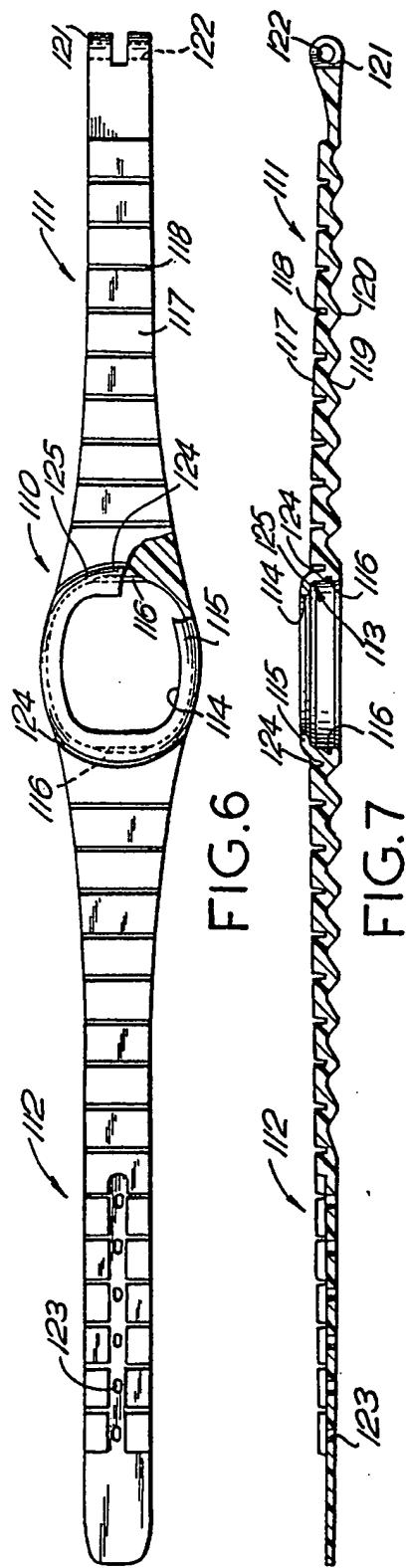


FIG. 9

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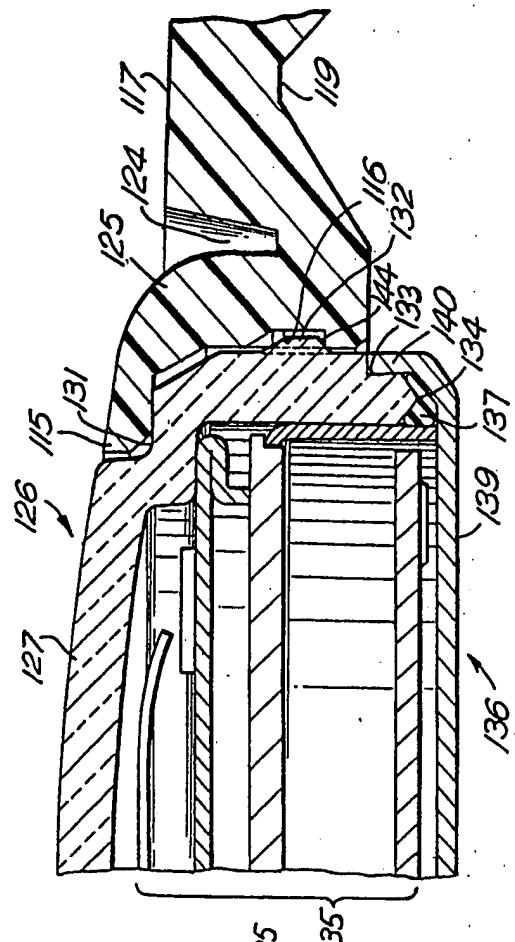
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SPECIFICATION**Watchcase assembly with integral plastics strap and bezel**

- 5 This invention relates generally to timepieces, and more particularly to a wristwatch case assembly comprising a bell-shaped crystal and a caseback forming a housing for a movement or module, and 10 an improved integral plastics bezel and strap.
- A conventional wristwatch construction generally includes a case, a crystal for viewing the hands or timepiece display, and a caseback, these three members together forming an enclosure which may 15 or may not be water-resistant. The conventional means for attaching a strap or band is by means of spring bars which snap into opposed lugs formed as portions of the case.
- Constructions have been proposed to reduce the 20 number of parts and the cost of the wristwatch by eliminating the conventional spring bar attachment between the case and the strap and by incorporating the strap into portions of the watch case or bezel.
- Some proposals have used a one-piece strap with an 25 enlarged area at the centre with a hole in it to receive part of the watch case through the hole and with means to attach bezel and caseback members on either side of the strap. Proposals have also been made for providing a one-piece strap and case. In 30 this construction, the strap is thickened and forms an enclosure to serve as part of the case. A caseback is attached to the thickened strap portion. In this manner a conventional module or movement may be placed inside the enclosure and viewed through 35 an opening in the top of the strap.
- Constructions are known for watch cases which, rather than having a conventional disc-shaped crystal attached at its edge to the bezel, uses a bell-shaped crystal formed from a transparent plastics. 40 moulding to include a depending cylindrical wall portion. The wall may include an integral pendant to receive the stem for a crown or push button. The caseback, in such cases, may be attached by a snap-fit onto the bottom of the depending wall 45 portion.
- Strap constructions are known, where the watch strap is moulded of plastics so as to incorporate spaced indentations providing thin sections to act as hinges and impart additional flexibility to the plastic 50 material. It is generally desired to have a watch strap of maximum flexibility for comfort, but to have a rigid bezel and watch case so as to protect the watch movement or module against damage. These two conflicting requirements have usually been satisfied 55 in the past by means of a hard case with a flexible strap separately attached to it.
- Accordingly it is an object of the present invention to provide an improved case assembly for a wristwatch, having an integral plastic bezel and strap. 60 Briefly stated, the invention comprises the improvement in a wristwatch case assembly comprising a bell-shaped crystal moulded of transparent material with a central viewing portion and a depending wall portion with an integral pendant 65 formed therein, and a caseback adapted to be attached to said depending wall portion to form a water-resistant enclosure, of an integral strap and bezel moulded of plastics materials with the bezel interposed between and joined to opposite strap 70 portions, the bezel having a central opening surrounding the central viewing portion of the crystal, and means including a plurality of protrusions on the crystal wall adapted to retain the crystal in the bezel. Such an improved plastic strap and bezel for a 75 wristwatch can readily be formed as a flexible strap section and a rigid bezel section.
- Two embodiments of the present invention will now be described by way of example, reference being made to the accompanying drawings, in 80 which:
- Figure 1* is enlarged cross-sectional elevation view of a wristwatch case assembly showing the preferred form of the invention,
- Figure 2* is a plan view of portions of the case 85 assembly of *Figure 1*,
- Figure 3* is a plan view of the crystal moulding in the preferred embodiment,
- Figure 4* is a cross-sectional view of the crystal taken along IV-IV of *Figure 3*,
- 90 *Figure 5* is an elevation view, partly in section, of the full integral bezel and strap moulding, with crystal incorporated,
- Figures 6 and 7* are plan view and cross-sectional elevation view, respectively, of the integral strap and 95 bezel, according to a modified form of the invention,
- Figure 8 and Figure 9* are plan view and elevation view, partly in cross-section, of the bell-shaped crystal used in the modified form of the present 100 invention, and
- Figure 10 and Figure 11* are enlarged cross-sectional elevation views along sections taken through the watch crown and taken through the strap section, respectively, showing the modified 105 form of assembled wristwatch.
- Referring now to *Figure 1* of the drawings, the wristwatch case assembly comprises a bezel 10 gradually blending into an integral strap portion 11. Disposed inside the bezel enclosure is a bell-shaped 110 crystal 12 moulded of transparent plastics material, such as Plexiglas V100, or similar material, to include a central viewing portion 13 and a cylindrical depending wall portion 14. (Plexiglas is a registered Trade Mark.) The depending wall incorporates an 115 integral pendant 15 with a circular opening 16 to accommodate a conventional watch stem or push button. The crystal wall also includes a peripheral ledge 17 and terminates at its lower end in a peripheral rim 18. Extending from diametrically 120 opposite sides of the crystal are protrusions, such as ears 19 with internal slots 20. Ears 19 are curved downwardly away from the viewing portion of the crystal and also tapered, as can be more clearly seen in *Figure 2* of the drawing.
- 125 A caseback 21 with a peripheral wall 22 is arranged to snap around the lower end of the depending wall portion 14 of the crystal. A compressible elastomeric gasket 23 serves to provide a water-resistant enclosure when caseback 21 is snapped onto the 130 depending wall portion 14 of the crystal. A conven-

tional mechanical timepiece movement, or alternatively an electronic module for a solid state or digital watch of a type well known in the art, is housed within the water-resistant enclosure.

5 The integral bezel and strap is moulded from plastics material.

A suitable plastic material is Thermoplastic Urethane, manufactured by K.J. Quinn and Co., Inc., U.S.A. The material preferably has a durometer on the order of Shore A 80A ± 3. Bezel portion 10 is moulded with a ledge 25 overlapping the peripheral shoulder 17, and a thickened downwardly sloping portion 26 surrounding the protrusions 19 and blending into the strap portion 11. The strap portions 15 may have moulded decorative raised sections 27 simulating conventional links.

During the moulding process, the plastics material used for the bezel is extruded into the openings 20 of protrusions 19, serving as a secure means for retaining the crystal in the bezel enclosure. Other types of interlocking shapes of the protrusions, such as saw-teeth or bulbous protuberances may also be employed.

The details of the bell-shaped crystal moulding 25 may be seen more clearly by reference to Figures 3 and 4 of the drawings. The moulding of transparent plastics material serves multiple functions of providing a viewing lens for the timepiece, providing an integral pendant, serving as a portion of the water-resistant enclosure (when attached to the caseback); and, most importantly, providing the protrusions which cooperate with the integral bezel and strap. The crystal moulding can incorporate a magnifying lens or "bubble" 28 to assist in viewing some 35 particular portion of the time keeping dial, such as day/date window.

Referring to Figure 5 of the drawings, the complete case and strap assembly is shown to include the bell-shaped crystal 12 and the integral bezel and 40 strap assembled thereto. The bezel 10 is interposed between and joined to strap portions 11a, 11b for the tongue and buckle respectively. Since the thickened portions 26 on opposite sides of the bezel slope downwardly on either side away from the crystal viewing portion, and since the strap portions 11a, 45 11b are relatively thin, a comfortable curvature for the wrist is provided by the thickened portions while still maintaining rigidity of the case.

The timepiece of Figures 1 to 5 is assembled as 50 follows: The bell-shaped crystal is first moulded of transparent plastics material. In a second moulding operation, the integral strap and bezel material is injected into a second mould which incorporates the previously moulded crystal, so that the strap and 55 bezel plastics material is overmoulded and extruded into the slots 20 in protrusions 19. Next, the movement is inserted and the caseback and gasket applied to enclose the movement.

Figures 6 and 7 of the drawings show a modified 60 form of integral strap and bezel which comprises a bezel 110 interposed between and blending into strap portions comprising a buckle portion 111 and a tongue portion 112. The bezel 110 and buckle and tongue portions 111, 112 are all moulded at the same 65 time of the same plastics material of medium

durometer such as the previously mentioned Thermoplastic Urethane which has a durometer on the order of Shore A 80 ± 3. The bezel defines an enclosure 113 shaped to conform to a crystal to be described below. A central opening 114 defines an overlapping ledge 115. A pair of oppositely disposed recesses 116 serve to retain the bell-shaped crystal as will be described.

The main body of the strap, on both the buckle and 70 tongue sides is made up of alternating thickened portions 117 simulating "links" and deep grooves 118 acting as "hinges". The underside of the thickened portions is undercut as illustrated at 119 to lend some flexibility to the thickened portions. Under the 80 grooves 118 are slight rounded sections 120. The buckle end 111 is thickened at its extremity 121 and provided with a hole 122 for the buckle shank. On the tongue end 112 of the strap, conventional buckle holes 123 are provided for the tang of the buckle. The 85 juncture between bezel and strap portions on either side is defined by deep grooves 124 which result in a relatively thin bezel wall 125.

Referring now to Figures 8 and 9, a bell-shaped crystal adapted to cooperate with the integral bezel 90 and strap of Figures 6 and 7 is indicated generally at 126. The crystal is moulded of transparent plastic material in a non-circular shape. In the embodiment shown, the shape is roughly elliptical but flattened at opposite ends of the major axis. Crystal 126 has a 95 central viewing portion 127 and a depending wall portion 128 which incorporates an integral pendant 129 having a central opening 130. Depending wall portion 128 and central viewing portion 127 define between them a peripheral shoulder 131. Formed in 100 diametrically opposite sides of depending wall 128 are protrusions 132 and recesses 133. Depending wall portion 128 terminates in a rounded peripheral rim 134.

Figures 10 and 11 are enlarged views showing 105 assembly of the wristwatch. Figure 10, which is a cross-section through the crown portion of the watch, shows a movement 135 disposed within a water-resistant enclosure made up of the crystal 126 and a caseback 136 with a gasket 137 of elastomeric material compressed therebetween. Caseback 136 may either be metal or plastics and is of a non-circular shape conforming generally to the rim 134 of the crystal depending wall 128. The caseback has a central portion 139 and a peripheral wall 140 over-lapping the bottom of the crystal wall 128. The 115 opening 130 in the integral pendant 129 receives a conventional stem 141 and crown 142 assembly with an "O" ring seal 143.

Although the movement 135 is illustrated for a 120 mechanical analog watch with hands, the crown, stem and seal 141, 142, 143 are illustrated for a conventional winding and setting mechanism, these aspects are merely exemplary. Thus, alternatively 125 movement 135 could be a solid state module or a stepping motor quartz analog movement of a type well known in the art and elements 141, 142, 143 would then comprise a sealed push button for actuating the electronic switching circuits in the wristwatch.

130 Figure 11, which is a cross-section through the

wristwatch at the juncture between strap and bezel, shows the protrusions 132 on the crystal wall fitting within recesses 116 in the bezel. The protrusions 132 include inclined walls 144 bearing on the bottom of 5 recess 116 to force the crystal and its shoulder 131 toward the peripheral ledge 115 of the bezel, which rests on shoulder 131 of the crystal. Rigidity and support is imparted to the relatively thin plastics bezel wall 125 by the depending crystal wall 128.

10 The wristwatch of Figures 6 to 11 is assembled by inserting the movement into the bell-shaped crystal and applying caseback 136 with a snap-fit enabled by the caseback walls 140 and grooves 133. A water-resistant enclosure is therefore achieved by 15 means of the compressed gasket 137. The watch crown within its pendant are part of the foregoing assembly.

The crystal and movement assembly are then inserted into the bezel enclosure 113, this being 20 enabled by slightly bending the bezel, and retained by protrusions 132 on the crystal wall which are forced into the mating recesses 116 in the bezel wall.

Added strap flexibility is largely imparted by the deep grooves 118 acting as "hinges" about fulcrum 25 points 120. Slight additional flexibility of the strap is provided by the undercut portions 119.

CLAIMS

30 1. A wristwatch case assembly comprising a bell-shaped crystal moulded of transparent material with a central viewing portion and a depending wall portion with an integral pendant formed therein, a caseback adapted to be attached to said depending 35 wall portion to form a water-resistant enclosure; an integral strap and bezel moulded of plastics material and comprising a bezel interposed between and joined to opposite strap portions, which strap portions blend into and become an integral part of the 40 bezel, said bezel defining an enclosure for receiving said crystal, and having a central opening surrounding said crystal viewing portion, and means comprising a plurality of protrusions on the crystal wall cooperating with the bezel and adapted to retain the 45 crystal within the bezel enclosure.

2. A wristwatch case assembly according to Claim 1, wherein said crystal wall protrusions comprise a pair of diametrically opposed ears, and wherein portions of said bezel wall are moulded 50 around said protrusions to hold the crystal in the bezel.

3. A wristwatch case assembly according to Claim 2, wherein said protrusions include recesses therein, and said bezel material substantially fills 55 said recesses.

4. A wristwatch case assembly according to Claim 2, wherein said protrusions are curved downwardly away from the viewing portion of the crystal, and the bezel and strap portions are joined by a 60 thickened tapered section moulded over said protrusions.

5. A wristwatch case assembly according to Claim 1, wherein said bezel defines a peripheral ledge around the central opening, said crystal defines a peripheral shoulder around the central view-

ing portion, and said bezel wall includes a plurality of recesses adapted to receive said protrusions on the crystal wall and cooperating to hold the crystal in the bezel.

70 6. A wristwatch case assembly according to Claim 5, wherein said protrusions include inclined walls bearing on the bottom of said recesses to force the crystal shoulder against the bezel ledge.

7. A wristwatch case assembly comprising a bell-shaped crystal moulded of transparent plastics material with a central viewing portion and a depending wall portion with an integral pendant formed therein, a caseback adapted to be attached to the rim of said depending wall portion with a compressible gasket in a snap-fit to provide a water-resistant enclosure, an integral strap and bezel moulded of plastics material and comprising a bezel interposed between and joined to opposite flexible strap portions, which strap portions blend into and become an integral part of the bezel, said crystal wall including at least one pair of diametrically opposed protrusions, said bezel defining an enclosure for receiving the crystal and having a central opening surrounding the crystal viewing portion, and said 90 bezel being formed with diametrically opposite cavities adapted to enclose said protrusions and cooperate with the protrusions to retain the crystal in the bezel.

8. A wristwatch case assembly substantially as hereinbefore described with reference to Figures 1 to 5 or Figures 6 to 11 of the accompanying drawings.

Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1983.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.